(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 099 725**
A3

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **83304067.8**

(51) Int. Cl.⁴: **C 23 C 13/08**

(22) Date of filing: **13.07.83**

(30) Priority: **14.07.82 US 398151**

(43) Date of publication of application:
01.02.84 Bulletin 84/5

(88) Date of deferred publication of search report: **23.01.85**

(84) Designated Contracting States:
BE CH DE FR GB IT LI LU NL SE

(71) Applicant: **THE STANDARD OIL COMPANY**
Midland Building
Cleveland, Ohio 44115(US)

(72) Inventor: **Vukanovic, Vladimir**
66 Westland Avenue
Rochester New York 14618(US)

(74) Representative: **Smith, Sydney et al,**
Elkington and Fife High Holborn House 52/54 High Holborn
London WC1V 6SH(GB)

(54) High pressure, non-local thermal equilibrium arc plasma generating apparatus for deposition of coatings upon substrates.

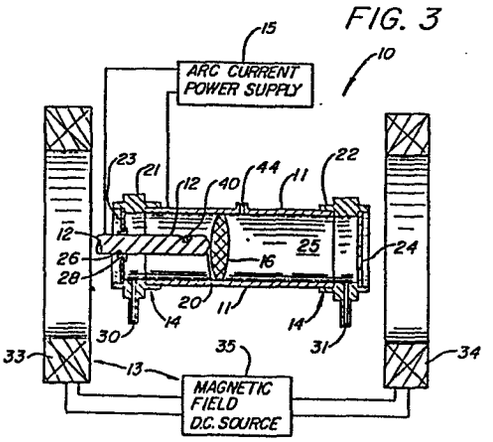
(57) An apparatus for generating an arc plasma in a non-local thermal equilibrium and an apparatus for the deposition of a material upon a substrate comprising the above are disclosed.

Referring to the accompanying illustrative drawing, a closed chamber (25) is defined by a cylindrical anode (11) and annular housings (21, 22) carrying transparent end plates (23, 24). A pencil-shaped cathode (12) is passed through one end plate (23) coaxially into chamber (25) so that its tapered end (20) is spatially proximate to an exit orifice (44) centrally located in anode (11). Gas ports (30, 31) permit the introduction of a preselected gaseous environment at the desired pressure into chamber (25). A low-current arc is struck between anode (11) and cathode (12) establishing the desired plasma. Two coils (33, 34) are coaxially placed radially outward of both ends of the chamber in a Hemholtz coil configuration to generate a uniform magnetic field in chamber (25) and induce rotation of the arc plasma. The coating material is introduced into the plasma as by a reservoir (40) in cathode (12) and its excited species ejected through exit orifice (44) in a plasma jet for deposition upon substrate adjacent thereto.

The apparatus generates a non-local thermal equilibrium arc plasma at the relatively high pressure of at least 1 atmosphere.

The present invention provides advantages over the prior art.

FIG. 3



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EUROPEAN SEARCH REPORT

0099725

Application number

EP 83 30 4067

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int Cl 4)
			C 23 C 13/08
Y	J. PHYS. D: APPL. PHYS., vol. 8, no. 12, 1975, pages 1423-1425, Letchworth, Herts, GB; J. LOTRIAN et al.: "Etude de l'émission continué d'une décharge d'arc entre electrodes de graphite dans la région 2400-5000 A" * Page 1423, lines 9-17; figure 1 *	1,3-6, 10-13, 15,19	

Y	AIAA JOURNAL, vol. 10, no. 1, January 1972, pages 17-18, New York; USA; K.J. CLARK et al.: "Thermochemical nonequilibrium in an argon constricted arc plasma" * Page 18, column 1, lines 14-36 *	1,3-6, 10-13, 15,19	
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A	FR-A-1 154 180 (E.I. DU PONT DE NEMOURS & CO.) * Page 1, column 1, lines 1-5; column 2, lines 32-40; figures *	1,3-7, 9-16, 19	C 23 C H 05 H H 01 J

A	US-A-3 416 021 (S.D. RAEZER) * Claims 1-6; figure 1 *	1,3-7, 9-19	

A	US-A-4 003 770 (R.J. JANOWIECKI et al.) * Figure 1 *	1-10, 23,24	
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	26-10-1984	GALANTI M.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int Cl 4)
A	JOURNAL OF THE ELECTROCHEMICAL SOCIETY, vol. 128, no. 12, December 1981, pages 2647-2655, Manchester, New Hampshire, USA; K.R. SARMA et al.: "High pressure plasma (HPP) deposition of polycrystalline silicon ribbons" * Page 2651, column 2, lines 12-21; figure 11 *	1,2,23,24	
A	APPLIED SPECTROSCOPY, vol. 31, no. 4, July/August 1977, pages 273-283; C.D. KEIRS et al.: "dc Plasma arcs for elemental analysis"		TECHNICAL FIELDS SEARCHED (Int. Cl.4)

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